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REPLY BY HARRISON E. WEBB, Central High School, Newark, N. J.

High-school teachers of mathematics should (1) do their utmost to restore the older ideal of high-school education as a serious business for the individual student; (2) relate their science as closely as possible to other studies which are pursued simultaneously; (3) preserve as closely as possible the essential continuity of the entire high-school mathematical course; (4) if necessary, as it may be, to accomplish these ends, eliminate excessive complications and omit less important topics; (5) give over entirely the notion that their subjects are absolutely logical, but make them positive so far as they go; and (6) believe in mathematics as possessing an incomparable moral value.

DISCUSSIONS.

RELATING TO INTERPOLATION IN TABLES OF TWO ARGUMENTS.

BY IRWIN ROMAN, Chicago, Ill.

Anyone who works with tables of two arguments has probably found interpolation inconvenient. The following method renders it possible with almost the same facility as interpolation in one argument. Let the function be given for four adjacent values, two in each argument. This may be represented schematically as follows. Let $A = f(x_1, y_1)$, $B = f(x_2, y_1)$, $C = f(x_1, y_2)$, $D = f(x_2, y_2)$ and let it be required to find $G = f(x_1 + \Delta x, y_1 + \Delta y)$ where

$$\frac{\Delta x}{x_2 - x_1} = e_x < 1 \qquad \text{and} \qquad \frac{\Delta y}{y_2 - y_1} = e_y < 1.$$

For convenience, let

$$x_1 \leqq x_1 + \Delta x \leqq x_2 \quad \text{and} \quad y_1 \leqq y_1 + \Delta y \leqq y_2.$$

Let

$$E = f(x_1, y_1 + \Delta y) \quad \text{and} \quad F = f(x_2, y_1 + \Delta y).$$

The usual way of finding G is to interpolate E from A and C, to interpolate F from B and D and finally, to interpolate G from E and F. This gives

$$E = A + e_y(C - A),$$

$$F = B + e_y(D - B),$$

$$G = E + e_x(F - E).$$

Carrying this step farther gives

$$\begin{aligned} G &= A + e_y(C - A) + e_x[B + e_y(D - B) - A - e_y(C - A)] \\ &= A + e_y(C - A) + e_x(B - A) + e_x e_y[(A + D) - (B + C)]. \end{aligned}$$

The last term is usually negligible, especially if $f(x, y)$ changes in the same sense for both x and y. This is simple to remember as it involves an interpolation horizontally and one vertically. It avoids the necessity of calculating E and F.